Course Policy

Department	Information Technology
Faculty	Computer Science
Course Code	
Course Title	Cloud computing
Credit hour	3
Pre-Requisite	Data Comm and Computer Networking
Course Instructor	Baitullah Malakhil
Text Book	1. Cloud Computing Principals and Paradigms 2. Essentials of cloud computing (2015)
Reference Book	1. Cloud Computing Principals and Paradigms 2. Essentials of cloud computing (2015)

1. Course Description:

The Cloud Computing course cover the main concepts, terminologies, network & security deployment mechanisms, virtualizations, hypervisors and types of cloud computing. The idea is to equip the students with the knowledge of the cloud computing and enable them to build a sample cloud computing environment using their own laptops. The private and public cloud along with the most famous Cloud Service Providers (CSP) will also be described in details.

2. Course Learning Objectives (CLO):

1. Understanding the concept, demand and importance of cloud computing
2. Understanding the NIST definition, deployment and service models of cloud computing
3. Knowledge of cloud characteristics
4. Models for migration into cloud computing
5. Knowing cloud services offered by different cloud service providers
6. Understanding cloud computing security concerns
7. Software for creating private or public cloud

Course Policy

3. Learning Domain:

- Cognitive (knowledge)
- Affective (Attitude)
- Psychomotor (Physical or Manual skills)

Only cognitive domain is used for this course while the rest two cannot applied here

4. Course Learning Objectives Mapping with Bloom Taxonomy:

1) Remembering
2) Understanding
3) Applying
4) Analyzing
5) Evaluating
6) Creating

COLs	1	2	3	4	5	6
CLO1	True	True		True		
CLO2		True		True		
CLO3	True	True		True		
CLO4	True	True		True		
CLO5		True		True		
CLO6	True	True		True		
CLO7		True		True		
CLO8	True	True		True		

5. Course Teaching Methods

Course Policy

1	Lecture
2	Problem solving Learning
3	Interactive Learning
4	Practical sessions

6. Grading Scheme

Mid Term	20%
Assignments	10%
Quiz	10%
Final Term	60%

7. Weekly Course Breakdown:

Week	Topic	Objectives	Activities	Assessment	
1	Chapter 1 – Computing paradigm - High-Performance Computing - Parallel Computing - Distributed Computing - Cluster Computing - Grid Computing - Cloud Computing	-Understanding the course outline and objectives -History of cloud computing	-Class Discussion	Oral assessment at class	
2	**Chapter 2 Cloud Computing Fundamentals** - The Need for Cloud Computing - Defining Cloud Computing	- NIST definition of cloud -	-Class Discussion	Oral assessment at class	

Course Policy

	- NIST Definition of Cloud Computing - Cloud Computing Is a Service - Cloud Computing Is a Platform - Principles of Cloud computing				
3	**Chapter 2 Cloud Computing Fundamentals:** - Five Essential Characteristics - Four Cloud Deployment Models - Three Service Offering Models - Requirements for Cloud Services - Cloud Application	-Cloud computing characteristics	-Class Discussion	Oral assessment at class	
4	**Chapter 3 – Cloud Computing Architecture and Management** - Cloud Architecture - Layer 1 (User/Client Layer) - Layer 2 (Network Layer) - Layer 3 (Cloud Management Layer) - Layer 4 (Hardware Resource Layer)	-Cloud computing architecture	-Class Discussion	Oral assessment at class	

Course Policy

5	**Chapter 3 (continued):** - Migrating Application to Cloud - Approaches for Cloud Migration	-understanding the migration models into cloud and their phases	-Class Discussion	Oral assessment at class	
6	**Chapter 4 Cloud Deployment Models** - Introduction - Private Cloud - On-Premise Private Cloud - Outsourced Private Cloud - Public cloud - Hybrid cloud - Community cloud	-Understanding the deployment and service models of cloud computing	-Class Discussion	Oral assessment at class	
7	**Chapter 5 – Cloud Service Models.** - Introduction - Infrastructure as a Service - Platform as a Service - Software as a Service	-Understanding PaaS, IaaS, SaaS	-Class Discussion	Oral assessment at class	
8	**Chapter 6 Virtualization** - Virtualization - Approaches in Virtualization - Full Virtualization - Para virtualization	-Understanding virtualization and its types	-Class Discussion	Oral assessment at class	
9	**Chapter 6 (continued)** - Hypervisor and Its Role - Types of Virtualization - OS Virtualization - Server Virtualization	-Understanding hypervisor and hardware virtualization	-Class Discussion	Oral assessment at class	

Course Policy

	- Memory Virtualization - Storage Virtualization - Network Virtualization - Application Virtualization				
10	**Chapter 10 – Networking for Cloud Computing** - Introduction - Overview of Data Center Environment - Architecture of Classical Data Centers - Storage and Networking Infrastructure - Networking Issues in Data Centers	--Understanding the networking in the cloud data centers	-Class Discussion	Oral assessment at class	
11	**Chapter 10 – (continue)** - Transport Layer Issues in DCNs - TCP Impairments in DCNs o TCP Incast o TCP Outcast o Queue Buildup o Buffer Pressure - TCP Enhancements for DCNs - TCP with Fine-Grained RTO (FG-RTO - TCP with FG-RTO + Delayed ACKs Disabled	-Understanding DCN and other related issues	-Class Discussion	Oral assessment at class	
12	**Chapter 11 – Cloud Service Providers** - Google	-Main Cloud service providers and the services they offer	-Class Discussion	Oral assessment at class	

Course Policy

	o Cloud Platform o Cloud Storage o Google Cloud Connect o Google Cloud Print o Google App Engine - Amazon Web Services o Amazon Elastic Compute Cloud o Amazon Simple Storage Service o Amazon Simple Queue Service - Microsoft - Windows Azure - IBM o Cloud Models o IBM SmartCloud - Salesforce - Rackspace				
13	**Chapter 12 Security in Cloud Computing** - Cloud General Challenges - Security Aspects o Data Security o Access Control o Encryption and Decryption o Virtualization Security - Network Security	-Understanding the security vulnerabilities and concerns in the cloud computing	-Class Discussion	Oral assessment at class	
14	**Chapter 12 – (Continue)**	-Understanding the security	-Class Discussion	Oral assessmen	

Course Policy

	- Software-as-a-Service Security Issues - Platform-as-a-Service Security Issues - Infrastructure-as-a-Service Security Issues	vulnerabilities and concerns in the cloud computing		t at class	
15	**Clustering** - Purpose of Clustering - Cluster components - Major type of cluster o -Storage o -High availability o -Load balancing o -High performance - Clustering functionality - Cluster share volumes	-Understanding the concept of clustering in cloud computing	-Class Discussion	Oral assessmen t at class	
16	**A Sample Practice:** - Creating a private cloud service provide (CSP) infrastructure using a single laptop with the open source tools like OpenStack and CloudStack	-A practice for students	-Class Discussion	Oral assessmen t at class	